



Aerial Refueling

E Q U I P M E N T

Air & Fuel Division

Parker Hannifin Corporation

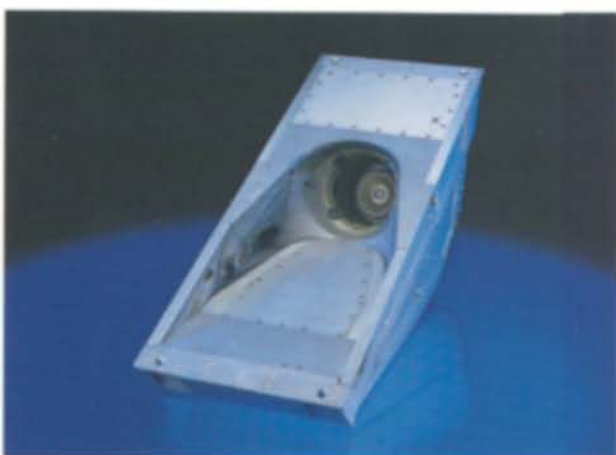
Parker
Aerospace

Aerial refueling couplers, nozzles, receptacles, and test kits from Parker's Air & Fuel Division represent today's leading edge in design, performance, and durability. With decades of success supplying flight-critical components from fuel systems to airframe pneumatics to engine products, Parker Air & Fuel has been a partner on nearly every aircraft and spacecraft manufactured in the Western world.



Fueling Success Worldwide

Our history of excellence is a result of our commitment to technological innovation and unsurpassed customer service. By continually upgrading our facilities and investing in the latest equipment, Parker's Air & Fuel Division remains the world leader in developing solutions for tomorrow's complex problems. With teams of experienced professionals dedicated to the satisfaction of every customer, Parker Air & Fuel is able to meet the unique challenges facing the aerospace industry today.



As a division of Parker Aerospace, Parker Air & Fuel is a member of a group of strategically aligned companies serving the engineering and manufacturing requirements of the aerospace industry. Our parent corporation, Parker Hannifin, provides the long-term stability, global resources, and worldwide network of support that make Parker Air & Fuel the best choice for your refueling needs.



MA-2, MA-3, and MA-4 *Couplers*



MA-2 and MA-3 Coupler

MA-2 Nozzle

MA-4 Coupler

Parker MA-2, MA-3, and MA-4 Couplers

Feature	MA-2	MA-3	MA-4
Part numbers			
With shroud	7-653-181-2	2820040-101	2820060-102
Without shroud	7-653-181-2-1	2820040-102	2820060-103
Length (inches)	15.0	15.2	20.66
Weight (maximum pounds)	18.0	18.0	21.5
Regulation	None	Single	Dual
Control pressure	None	65 PSI max.	65 PSI max.
Surge protection	None	120 PSI max.	120 PSI max.
Applicable specifications	MIL-C-25162 MS 24355	MIL-C-81975B	MIL-C-81975B (with dual regulation)

Pressures (PSI)

	Nozzle Connected	Coupling or Nozzle Alone
Operating	120 max.	120 max.
Proof	180	240
Burst	240	360

Rated flow: 600 GPM

Temperature: -65° F to 160° F

Detail envelopes and performances are in accordance with applicable specifications and Parker installation drawings.

All couplers are compatible with MA-2 nozzles per MIL-N-25161C, Type 2, Class B.

For today's demanding aerial refueling requirements, Parker Air & Fuel manufactures a line of couplers known for their rugged reliability. Fully qualified, approved and compatible with all nozzles currently in service, Parker's



MA-2, MA-3, and MA-4 couplers are suitable for use with all military

and commercial hydrocarbon fuels.

Coupling Test Kit



Parker's 81015 test kit contains all the elements needed to functionally test refueling coupler types MA-2, MA-3, and MA-4.

The 81015 test kit contains:

- *Tester assembly*
- *Transit case conforming to MIL-T-28800*
- *Reel-cable assembly for system electrical grounding*
- *Test plug assembly for MA-4 regulator testing*
- *Two (2) hose assemblies for drain and regulator testing*
- *Test cap assembly for disabling the KC-135 upstream regulator during MA-4 regulator testing*

With the tester mechanically latched into the coupling, the flow path can be opened by manual rotation of the crank on the tester side, permitting leakage testing of the mated system. An integral hydraulic hand pump provides measured separation force to check toggle breakaway force, which is displayed on a force gauge mounted on the tester face. A standard ground fueling adapter permits on or off loading of fuel, as required.

Specification Summary

Fuel Pressures: Operating: 60 PSIG
Proof: 240 PSIG
Burst: 360 PSIG

Rated Flow (Fuel and Defuel): 600 GPM @ 18 PSID max.
Fuel Separation Force Readout: 0 to 850 lbs.
Contact and Mated Leakage: Zero @ 240 PSIG
Disconnect Leakage: 200 cc max. @ 55 ± 5 PSIG
Dry Weight (Actual): Tester: 22.25 lbs. Kit: 59.75 lbs.
Case Dimensions: 30.38" x 12.0" x 15.5"

Calibration Test Kit



Parker's 81014-1001 test kit provides a means for field calibration of the force gauge on the Parker 81014 drogue coupling tester (contained in the 81015 coupling tester kit). The force gauge measures the breakaway force for MA-2, MA-3, and MA-4 couplings. When the 81014 coupling tester is installed in the fixture assembly, tension hydraulic force produced by the coupling tester hand pump is transmitted through cable assemblies to a calibrated load cell rigidly attached to the calibration tester frame. All required calibration points between the load range of 0 and 800 pounds can be measured.

The 81014-1001 test kit contains:

- *Transit case conforming to MIL-T-28800*
- *Calibration test fixture for 81014 coupling tester*
- *Two (2) restraining cable assemblies for attaching load cell assembly to the 81014 coupling tester*
- *Case Dimensions: 30.38" x 12.0" x 15.5"*

Receptacle

Test Kit

Boom Nozzle

Test Kit



Parker's 2022-51 test kit allows users to perform pre-flight functional tests on receptacles conforming to MIL-R-27521. Once engaged, electrical indication of status and voice intercommunication is provided through the built-in signal coil. A rechargeable battery pack provides electrical power. Position signal pulses are initiated by a three-position momentary switch and transmitted to the receiver to verify the system's electrical integrity. On or off loading of fuel is permitted by a standard ground fueling adapter, and a push-to-open valve allows for tester bleeding or pressurization. The tester electrical panel includes on/off switch, voltmeter, high or low voltage (18 or 28 VDC) selector switch, intercom push-to-talk button, and battery-charging on lamp.

The 2022-51 test kit contains:

- Tester assembly
- Transit case conforming to MIL-T-28800
- Grounding cable
- Two (2) restraining cable assemblies (longer cables available)
- Removal tool for replacement of the receptacle's sliding valve
- Charging cable for battery recharging from a 110 VAC-60 Hz power source
- Hose assembly for bleeding and draining the tester
- Intercom adapter cable for headset use during push-to-talk communication

Specification Summary

Fuel Pressure: Operating: 60 PSIG
Proof: 240 PSIG
Burst: 360 PSIG

Rated Flow (Fuel and Defuel): 600 GPM @ 18 PSID max.
Contact and Mated Leakage: Zero @ 240 PSIG
Disconnect Leakage: 25 cc max. @ 55 ± 5 PSIG
Dry Weight: Tester: 23.5 lbs. Kit: 60.0 lbs.
Case Dimensions: 30.38" x 12.0" x 15.5"

Parker's 81018 test kit enables pre-flight functional tests on boom nozzles conforming to MS27604. Once engaged, electrical indication of status and voice intercommunication is provided through the built-in signal coil. A rechargeable battery pack provides electrical power. Position signal pulses are initiated by a three-position momentary switch and transmitted to the tanker to verify the boom system's electrical integrity. On or off loading of fuel is permitted by a ground fueling adapter, and a push-to-open valve allows for tester bleeding or pressurization. Tester electrical panel includes on/off switch, voltmeter, high or low voltage (18 or 28 VDC) selector switch, intercom push-to-talk button, and battery-charging on lamp.

The 81018 test kit contains:

- Tester assembly
- Transit case conforming to MIL-T-28800
- Reel-cable assembly for system electrical grounding
- Two (2) restraining cable assemblies for keeping the tester & boom together
- Removal tool for replacement of the receptacle's sliding valve
- Charging cable for battery recharging from a 110 VAC-60 Hz power source
- Hose assembly for bleeding and draining the tester
- Intercom adapter cable for headset use during push-to-talk communication
- Anti-swivel clamp which mounts on nozzle ball joints and restricts swivel
- Restraining clamps which attach to the KC-10 and the KC-135 nozzle & provide safety cable connections

Specification Summary

Fuel Pressures: Operating: 60 PSIG
Proof: 240 PSIG
Burst: 360 PSIG

Rated Flow (Fuel and Defuel): 600 GPM @ 18 PSID max.
Contact and Mated Leakage: Zero @ 240 PSIG
Disconnect Leakage: 25 cc max. @ 55 ± 5 PSIG
Dry Weight (Actual): Tester: 28.75 lbs. Kit: 83.25 lbs.
Case Dimensions: 32.94" x 14.5" x 16.94"

Improved Boom Nozzle



Parker's improved boom nozzle is completely interchangeable with the standard MS27604 KC-135 boom nozzle and is compatible with any MIL-R-27521 type receptacle. Once engaged, electrical indication of status is provided to the tanker through the nozzle's built-in signal coil. Refueling can be accomplished at up to 1000 GPM.

When refueling is complete, disconnect can be commanded by the tanker or receiver aircraft. The new independent disconnect capability of the improved boom nozzle provides an alternate means for disconnect not available in a standard KC-135 nozzle and ensures disconnect in the event of a receiver system failure. Immediately after disconnect, the electrically operated independent disconnect system automatically resets and the refueling process can be repeated.

Specification Summary

Fuel Pressures: Operating: 0 to 120 PSI
Proof: 240 PSI
Burst: 360 PSI

Pressure Drop: 21 PSI at 1000 GPM

Fuel Leakage: Disconnect: 30 cc max.
External: Zero

Electrical: Voltage Range: 18 to 30 VDC
Current: 1.0 amps max.

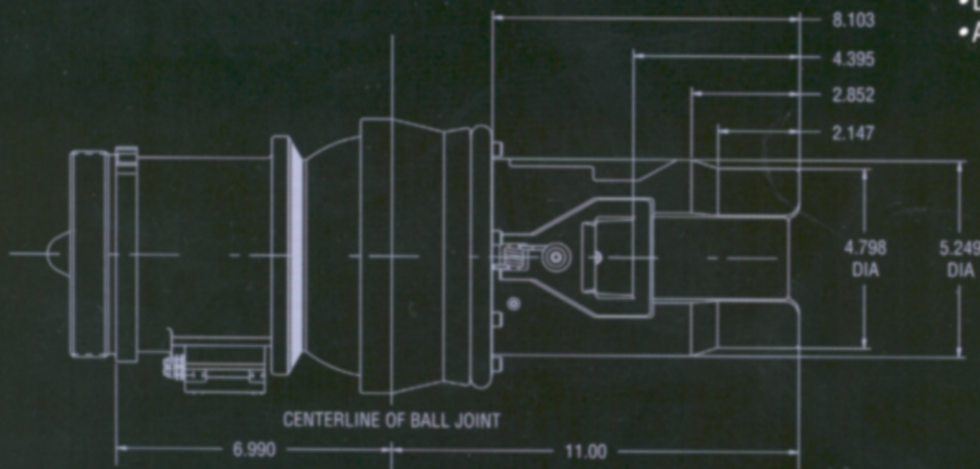
Temperature Range (Fluid & Ambient): -65° F to 160° F

Ultimate Structural Load Capability: 15,000 lbs. tension
21,000 lbs. compression

Dry Weight: 35 lbs.

Independent Disconnect Systems Feature

- No external energy or stored gas required
- Electrically operated by existing boom disconnect system
- Disconnect time: 0.35 seconds max.
- Automatic reset after disconnect



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